

In the Claims

The claims stand as follows:

1. (previously presented) A method of depositing material on a substrate comprising:

providing a reactor with a reaction chamber having a first volume;
securing a substrate within the reaction chamber;
introducing a first precursor into the reaction chamber at the first chamber volume;
contacting a surface of the substrate in the reaction chamber with the first precursor at the first chamber volume to cause a reaction of the first precursor with and deposit a first layer on the substrate; and
enlarging the reaction chamber to a second, larger volume to reduce concentration of the first precursor and removing undeposited first precursor to end reaction of the first precursor.

2. (previously presented) The method of claim 1 further including:

reducing the reaction chamber to the first chamber volume;
introducing a second precursor into the reaction chamber at the first chamber volume;
contacting the first layer in the reaction chamber with the second precursor at the first chamber volume to cause a reaction of the second precursor with and deposit a second layer on the first layer, thereby forming a film; and

enlarging the reaction chamber to the second volume to reduce concentration of the second precursor and removing undeposited second precursor to end reaction of the second precursor.

3. (previously presented) The method of claim 1 wherein removing undeposited first precursor is by purging the reaction chamber at the second volume with a gas.
4. (previously presented) The method of claim 1 wherein removing undeposited first precursor is by exposing the reaction chamber at the second volume to a vacuum.
5. (previously presented) The method of claim 1 wherein the reaction chamber includes a pedestal adapted to secure the substrate during the deposition and movable within the chamber between an upper position and a lower position, the reaction chamber having the first volume when the pedestal is in the upper position and the second, larger volume when the pedestal is in the lower position, a first chamber section above the pedestal in the upper position defining the first chamber volume, and a second chamber section outside the first chamber section; and wherein the reaction chamber is enlarged to the second, larger volume by moving the pedestal to the lower position such that the first and second chamber sections together with the pedestal in the lower position define the second chamber volume.
6. (previously presented) The method of claim 1 wherein the second chamber volume is on one or more sides of the pedestal.

7. (previously presented) The method of claim 1 wherein the second chamber volume is below the pedestal.
8. (previously presented) A method of depositing a film on a substrate comprising:
 - providing a reactor with a reaction chamber, the reaction chamber including a pedestal adapted to secure a substrate during the deposition and movable within the chamber between an upper position and a lower position, the reaction chamber having a first volume when the pedestal is in the upper position and a second, larger volume when the pedestal is in the lower position;
 - securing a substrate on the pedestal;
 - introducing a first precursor into the reaction chamber when the substrate is on the pedestal is in the upper position at the first chamber volume;
 - contacting a surface of the substrate in the reaction chamber with the first precursor at the first chamber volume to cause a reaction of the first precursor with and deposit a first layer on the substrate;
 - lowering the pedestal to the lower position to enlarge the reaction chamber to the second, larger volume to reduce concentration of the first precursor and removing undeposited first precursor to end reaction of the first precursor;
 - raising the pedestal to the upper position to reduce the reaction chamber to the first chamber volume;
 - introducing a second precursor into the reaction chamber when the substrate is on the pedestal is in the upper position at the first chamber volume;

contacting the first layer in the reaction chamber with the second precursor at the first chamber volume to cause a reaction of the second precursor with and deposit a second layer on the first layer, thereby forming a film; and lowering the pedestal to the lower position to enlarge the reaction chamber to the second volume to reduce concentration of the second precursor and removing undeposited second precursor to end reaction of the second precursor.

9. (previously presented) The method of claim 8 wherein the reaction chamber includes a first chamber section above the pedestal in the upper position defining the first chamber volume, and a second chamber section outside the first chamber section; and wherein the reaction chamber is enlarged to the second, larger volume by moving the pedestal to the lower position such that the first and second chamber sections together with the pedestal in the second position define the second chamber volume.

10. (previously presented) The method of claim 1 wherein the second chamber volume is on the side of and below the pedestal.

11-19. (cancelled)

20. (previously presented) The method of claim 1 further including providing a perforated plate above the pedestal in the reactor chamber, and diffusing the first precursor through the perforated plate into the reaction chamber.

21. (previously presented) The method of claim 2 further including providing a perforated plate above the pedestal in the reactor chamber, and diffusing the first and second precursors through the perforated plate into the reaction chamber.
22. (previously presented) The method of claim 8 further including providing a perforated plate above the pedestal in the reactor chamber, and diffusing the first and second precursors through the perforated plate into the reaction chamber.
23. (previously presented) The method of claim 1 wherein the first layer is a different composition than the first precursor.
24. (previously presented) The method of claim 2 wherein the second layer is a different composition than the second precursor.
25. (previously presented) The method of claim 5 wherein the first layer is a different composition than the first precursor.
26. (previously presented) The method of claim 8 wherein the first layer is a different composition than the first precursor, and the second layer is a different composition than the second precursor.
27. (previously presented) The method of claim 5 wherein the first chamber section above the pedestal has spaced side walls and chamfered corners on lower ends of the side walls, wherein the pedestal has a diameter greater than the spacing between the

first chamber section side walls, and wherein the pedestal has chamfered edges that correspond with the chamfered corners on the lower ends of the first chamber section side walls.

28. (previously presented) The method of claim 9 wherein the first chamber section above the pedestal has spaced side walls and chamfered corners on lower ends of the side walls, wherein the pedestal has a diameter greater than the spacing between the first chamber section side walls, and wherein the pedestal has chamfered edges that correspond with the chamfered corners on the lower ends of the first chamber section side walls.